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Towards international recommendations for energy statistics

Report of the Secretary-General

Summary

The present report was prepared at the request of the Statistical Commission at its thirty-seventh session.[a] The report elaborates the need for the preparation and updating of the international recommendations for energy statistics, outlines the United Nations Statistics Division strategy with respect to the organization of the revision and updating process, describes actions undertaken and provides a summary of its action plan for 2009-2011. Points for discussion by the Commission are contained in section IV of the present report.

[a] *Official Records of the Economic and Social Council, 2006, Supplement No. 4* (E/2006/24), chap. C, dec. 37/108 (b), (c), (d) and (f).

* E/CN.3/2009/1.

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I. Introduction

1. The Statistical Commission, at its thirty-seventh session (7-10 March 2006), inter alia, recommended the development of energy statistics as part of official statistics, supported the review of the United Nations manuals on energy statistics, and emphasized the urgent need for harmonization of energy definitions and compilation methodologies and for the development of international standards in energy statistics.[1] At its thirty-eighth session (27 February-2 March 2007) the Commission took note of the progress reports by the Oslo Group on Energy Statistics and by the Intersecretariat Working Group on Energy Statistics.

2. The present report describes the Statistics Division activities undertaken in 2007-2008 to coordinate implementation of the Commission decisions and to ensure the timely preparation of the revised and updated international recommendations for energy statistics, which would serve as a foundation for the further development and improvement of quality of official energy statistics. Section II of the report elaborates the need for the revision and updating of the Commission recommendations for energy statistics in the light of various developments relevant to energy statistics and country responses during a worldwide consultation on the scope and contents of future revised recommendations. Section III outlines the Statistics Division strategy for the organization of the revision process, and describes activities already undertaken in this direction and its actions planned for the period 2009-2011. Section IV contains points for discussion by the Commission.

II. Need for the preparation of the revised and updated international recommendations for energy statistics

3. The international guidance on energy statistics is currently contained in the following United Nations publications: *Concepts and Methods in Energy Statistics, with Special Reference to Energy Accounts and Balances: A Technical Report*;[2] *Energy Statistics: Definitions, Units of Measure and Conversion Factors*[3] and *Energy Statistics: A Manual for Developing Countries*.[4] These publications provided a foundation for basic energy statistics and energy balances compilation worldwide for about a quarter of a century. Their main provisions were incorporated into country methodologies and into handbooks and manuals issued subsequently by various regional and supranational organizations.

4. The publications mentioned above deal with many important topics, including coverage of energy statistics and its importance for policymaking, basic concepts and definitions of energy products and flows, units of measurement, energy balances, and the relationship between energy statistics and other economic statistics including national accounts. However, they need to be revised and updated to address many new issues and provide guidance on topics not previously covered.

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[1] *Official Records of the Economic and Social Council, 2006, Supplement No. 4* (E/2006/24), sect. C, dec. 37/108.

[2] United Nations Statistics Division, Series F, No. 29, 1982 (United Nations publication, Sales No. 82.XVII.13).

[3] Ibid., Series F, No. 44, 1987 (United Nations publication, Sales No. E.86.XVIII.21).

[4] Ibid., Series F, No. 56, 1991 (United Nations publication, Sales No. 91.XVII.10).

The areas where revision and updating are particularly needed are described briefly below.

5. *Energy statistics as part of official statistics*. There is a clear need to emphasize that official energy statistics should be based on the Fundamental Principles of Official Statistics. This includes the elaboration of the characteristics of energy statistics as official statistics and the recognition of various types of institutional arrangements, which might ensure compilation of high quality data.

6. *Scope of energy statistics*. An international agreement is needed on the scope of energy statistics, as country practices differ significantly in this respect. The issue is to be resolved by focusing on energy statistics as a complete system covering production, international trade, and transformation and use (consumption) of energy, as well as on the main characteristics of the energy sector. In this connection, the feasibility of use of the International Standard Industrial Classification of All Economic Activities (ISIC), the Harmonized Commodity Description and Coding System (HS) and the Central Product Classification (CPC), as well as applicability of the territorial and residential principles and the related definitions of the statistical population, have to be further discussed (e.g., use of the territorial principle in energy balances and the residency principle in energy accounts). There is also a need to elaborate the definition of the production boundary for the purposes of energy statistics.

7. *Standard international energy classification*. The Commission may recall that it had considered development of a standard classification of energy at its nineteenth session.[5] However, such a classification is still not available. The preparation and adoption of the standard international energy classification should help to organize the internationally agreed definitions of energy products into a hierarchical classification system, which would clearly represent the relationships between them and provide a coding system for use in data collection and data processing. The classification scheme of the standard international energy classification and its correspondence tables with other international product classifications such as HS and CPC has to be developed.

8. *Units of measurement and conversion factors*. There is a need to review the existing recommendations and country practices and update, if necessary, any relevant descriptions of units of measurement for the different products, including the recommended standard unit of measurement. The default conversion factors between units currently used in the absence of country-, region- and/or activity-specific conversion factors, have to be re-examined.

9. *Flows, stocks and related concepts*. A coherent set of definitions covering energy flows, stocks and related concepts should be developed. This should include further clarification of the boundary between certain flows and stocks and of the boundary between energy and non-energy flows. A description of the relationship between energy stocks and other related concepts (reserves, resources, inventories, etc.) has to be provided. In view of the preparation of recommendations on energy accounts, distinctions between flows and stocks, defined on the basis of territorial and residency principles, should be described. The issue of measurement of flows and stocks has to be reviewed and the appropriate recommendations provided.

[5] *Official Records of the Economic and Social Council, 1976, Supplement No. 2* (E/CN.3/500), para. 21 (b) (i).

10. *Statistical units and data items*. At the present time there are no clear recommendations on the statistical units (and their characteristics) for use in data collection from both energy and non-energy sectors. The reference list of data items for collection (together with their definitions) should be provided to reflect specificity of each energy product stock and flow and to ensure international comparability of the compiled statistics.

11. *Data sources and data compilation strategies*. There is a need to provide, in line with the international recommendations, an overview of data sources (e.g., administrative data, surveys, etc.) and data collection and data compilation strategies and methods relevant to both supply and use/consumption of energy. The effective institutional arrangements should be emphasized and promoted, including recommendations on the main types of data sources and key elements of the data compilation strategies.

12. *Energy balances*. The role of energy balances in organizing energy statistics in a coherent system and the importance of energy balances in making informed policy decisions should be reconfirmed and elaborated. The existing recommendations on the balances compilation should be reviewed and updated to provide more clarity on how to cover both energy supply and use/consumption using various data sources and on how to compile policy relevant energy balances.

13. *Data quality and metadata*. The existing recommendations do not address issues of quality and metadata in a systematic way. In this connection, the main dimensions of energy data quality are to be described and recommendations formulated on how to set up a national energy data quality framework, including the development and use of indicators of quality and reporting on data quality and metadata.

14. *Dissemination*. There is a clear lack of internationally agreed recommendations on the dissemination of energy statistics, including on energy statistics dissemination mechanisms, addressing data confidentiality, release schedules, core tables, dissemination of metadata and reporting to international and regional organizations.

15. *Uses of basic energy statistics and energy balances in the compilation of energy accounts and other statistics*. An explanation of the conceptual relationships between basic energy statistics and balances, on the one hand, and energy accounts, on the other, is needed to assist both compilers and users. This is to include guidance on a bridge table that would facilitate energy accounts compilation. An indication of how energy statistics might be used for the purposes of environment statistics, emission calculations and climate change is also to be provided.

III. Strategy of the Statistics Division for the organization of the revision and updating process

A. Scope of the future international recommendations for energy statistics

16. In the second half of 2007 the Statistics Division reviewed the work done in preparation for the revision of the existing United Nations publications on energy statistics. It decided that enough momentum had been created for the development

of international recommendations for energy statistics, which would consolidate in one document all recommendations for this area of statistics that might merit adoption by the Commission. The main objective of the international recommendations for energy statistics is to provide a firm foundation for long-term development of energy statistics based on the Fundamental Principles of Official Statistics. It is expected that the international recommendations for energy statistics will cover a wide range of issues, ranging from characteristics of official energy statistics, concepts and definitions for use in energy statistics and energy balances to data compilation strategies and dissemination policies. The additional guidance on technical details and description of good practices in energy statistics to assist countries in the implementation of the recommendations will be provided in the forthcoming Energy Statistics Compilers Manual.

17. The international recommendations for energy statistics should be aligned in structure and format with international recommendations approved by the Statistical Commission in other statistical domains, notably the International Recommendations for Industrial Statistics and the International Recommendations for Distributive Trade Statistics. The recommendations should take into account all relevant methodological work, such as the Energy Statistics Manual issued by the International Energy Agency (IEA/Organization for Economic Cooperation and Development) and Eurostat, and the upcoming System of Integrated Environmental-Economic Accounting, including recommendations for energy accounts.

B. Guiding principles for the revision and updating process

18. To ensure that the main objective of the international recommendations for energy statistics is achieved, the following principles for the revision and updating process were proposed by the Statistics Division and endorsed by the Oslo Group at its third meeting:[6]

(a) Needs of major user groups should be considered as a starting point and be taken into account to the maximum extent possible to ensure that the compiled data are policy relevant, meet the needs of the energy community (both producers and users) and provide a solid foundation for integration of energy statistics into a broader accounting framework;

(b) The revision should be conducted in close consultation with national statistical offices, national energy agencies, and the relevant international and supranational organizations;

(c) In providing recommendations on data items and their definitions care should be taken that (a) necessary data sources are available in at least some countries to compile such data; (b) the collection of such data items will not create significant additional reporting burden; and (c) collection procedures can be implemented by most countries to ensure improved cross-country comparability;

(d) The revision should be seen in the context of promoting an integrated approach within the national statistical system, which requires, to the extent possible, the use of harmonized concepts, classifications, and standardized data

[6] Available at http://og.ssb.no/.

compilation methods in order to achieve maximum efficiency and minimize reporting burden;

(e) Additional guidance on more practical and technical matters to assist countries in the implementation of the international recommendations for energy statistics should be treated in the Energy Statistics Compilers Manual. During the revision process, the Oslo Group will discuss the content of the manual. Preparation of the manual should be seen as a parallel process, as topics that might be treated in the recommendations in general terms would need further elaboration to assist data compilers. Ideally, the manual should be issued one year after the Commission adopts the international recommendations for energy statistics.

19. Based on the above principles, the provisional draft of the international recommendations for energy statistics is to be prepared by the Statistics Division, the Oslo Group and InterEnerStat. Other groups and forums will be consulted as appropriate (e.g., London Group, United Nations Committee of Exports on Environmental-Economic Accounting, etc.). The Statistics Division will coordinate the revision process, to conduct a worldwide consultation, to consolidate and to edit inputs into the successive versions of the draft international recommendations for energy statistics, and submit the final draft of the recommendations to the Commission. The Oslo Group and InterEnerStat are the key content providers to the recommendations and the Energy Statistics Compilers Manual, in accordance with the mandates given to them by the Commission.

C. Work accomplished and future activities

Development of the outline of the international recommendations for energy statistics

20. During the period 2007-2008 the Statistics Division was developing an outline of the future international recommendations for energy statistics. The detailed outline of the recommendations was presented to the Oslo Group at its third meeting. It was thoroughly discussed, amended and endorsed. The endorsed outline of the recommendations is contained in the annex to the present report.

The first stage of a worldwide consultation on the scope and contents of the future recommendations

21. The Statistics Division organized a worldwide consultation on the draft international recommendations for energy statistics to be conducted in two stages. The first stage of the consultation was undertaken in May 2008, in cooperation with the Oslo Group and IEA. It concentrated on the scope and content of the future recommendations. The consultation paper containing an outline of the recommendations and related questions were sent to national statistical offices, energy ministries and agencies, and international and regional organizations active in energy statistics. By September 2008, 71 national statistical offices, 29 energy ministries and agencies, and 5 organizations had sent their responses.[7]

[7] The report on the results of the consultation is available at http://unstats.un.org/unsd/energy/ires/consultation.htm.

22. The overwhelming majority (more than 98 per cent of the responses) supported the objective of the recommendations to strengthen energy statistics as part of official statistics serving multiple users. Countries emphasized the importance and the benefits of the forthcoming international recommendations for energy statistics. Respondents agreed that the recommendations should be flexible enough to ensure their implementation in all countries irrespective of the level of development of their statistical systems. In particular, it was supported that the list of data items to be described in the recommendations should be seen as a reference list from which countries can select the relevant items according to their situation, taking into account, for example, identified user needs, resources, priorities and respondent burden.

23. With regard to the intended scope of the future recommendations, there was strong support for the international recommendations for energy statistics to cover all aspects of the statistical process (94 per cent). Countries agreed that the recommendations should focus on the basic energy statistics and energy balances and should include recommendations on how energy statistics and balances are related to energy accounts and other national statistics. Countries broadly endorsed the suggested structure of the recommendations (the percentage of favourable responses for the chapters varied from a minimum of 93 per cent to a maximum of 99 per cent).

24. Many respondents provided specific suggestions regarding the contents of the recommendations, stressing the importance of specific topics, such as (a) consistency of data on production, imports and exports in energy statistics with general production statistics and international merchandise trade statistics; (b) clarification of statistical treatment of new sources of energy; (c) use of administrative records; (d) design and organization of sample surveys; (e) various energy indicators (efficiency indicators, energy indicators, energy sector, per capita consumption indicators); (f) guidance on the appropriate emission factors in the assessment and compilation of carbon emissions; and (g) energy prices and taxes. Some countries indicated also that more technical details on data compilation and dissemination should not be part of the recommendations, as they would be country specific, and that they should be treated extensively in the Energy Statistics Compilers Manual.

Harmonization of definitions of energy products and energy flows

25. An important step forward was made by InterEnerStat during its October 2008 meeting, where a proposal for harmonized definitions in energy statistics was discussed. During 2009 the additional consultations on definitions of energy products and flows will be conducted within InterEnerStat to resolve the outstanding issues. The harmonized definitions will be reflected in the international recommendations for energy statistics.

Status of preparation of the provisional draft of the international recommendations for energy statistics

26. The drafting schedule for the recommendations was agreed to and has been placed on the Oslo Group website. The issue papers and draft text of particular chapters and sections are being placed by the Oslo Group secretariat on its website and discussed by its members.

Future activities

27. The Statistics Division is organizing with the National Institute of Statistics Geography and Informatics (INEGI) of Mexico an international workshop on energy statistics to be held in Aguascalientes, Mexico from 2 to 5 December 2008. The main objective of the workshop is to consult with selected developing countries on their needs and capabilities in the area of energy statistics compilation, in order to better take them into account in the future recommendations. The Oslo Group and InterEnerStat are actively collaborating with the Statistics Division and INEGI in preparation of the event.

28. The fourth meeting of the Oslo Group is to be held in Ottawa, from 2 to 6 February 2009. The main objective of the meeting will be to review the status of preparation of the provisional draft of the international recommendations for energy statistics. The Statistics Division will submit to the meeting all available drafts of particular chapters and sections and its proposal regarding the organization of the second stage of a worldwide consultation.

29. The Statistics Division is planning for the second stage of the worldwide consultation to focus on the full text of the provisional draft of the recommendations and to provide a basis for the finalization of the draft. It is expected that the consultation will be held in the second half of 2009.

30. After the results of the consultation are processed, the Statistics Division will hold the second meeting of the ad hoc United Nations Expert Group on Energy Statistics. The Expert Group will review the results of the worldwide consultation and advise on further amendments to the provisional draft and on the date of its submission to the Commission for adoption.

IV. Points for discussion

31. **The Commission may wish:**

(a) **To endorse the Statistics Division strategy to prepare the international recommendations for energy statistics and to request that an early submission of the draft recommendations to the Commission for adoption be considered as a matter of priority;**

(b) **To advise that the draft recommendations should provide an updated conceptual framework of official energy statistics and a necessary policy guidance on data compilation and data dissemination in the context of an integrated approach to economic statistics;**

(c) **To stress that it is essential that the revision of the recommendations is carried out in full consultation with national statistical offices and national energy ministries and agencies, including a worldwide consultation on the provisional draft of the recommendations;**

(d) **To recommend that technical details relevant to the compilation of energy statistics and good country practices be published in the Energy Statistics Compilers Manual to assist countries in the implementation of the revised and updated recommendations;**

(e) To advise the Statistics Division to submit the revised and updated recommendations to the ad hoc United Nations Expert Group on Energy Statistics for evaluation; the Expert Group will have a mandate to review and endorse the draft recommendations prior to their submission to the Commission.

Annex

International recommendations for energy statistics

Draft outline

Foreword

Acronyms

Acknowledgements

Chapter 1. Introduction

This chapter is intended to formulate the objectives of the international recommendations for energy statistics. It will be emphasized that the main objective of the recommendations is to provide a firm foundation for the long-term development of energy statistics as a part of official statistics based on the Fundamental Principles of Official Statistics. The chapter will stress the importance of energy statistics for sound decision- and policymaking, identify needs of the major user groups and describe how they are dealt with in the subsequent chapters. The historical background of recommendations will be presented with a special reference to the recent decisions of the United Nations Statistical Commission on updating the United Nations handbooks on energy statistics, energy balances and accounts. This chapter will also describe the relationship between the recommendations and the *Energy Statistics Manual* by IEA/Eurostat and the forthcoming United Nations publications, namely Energy Statistics Compilers Manual and the System of Environmental-Economic Accounting, which is expected to provide international standards on energy accounting.

Chapter 2. Scope of energy statistics

The purpose of this chapter is to define the scope and coverage of energy statistics. The chapter will begin with a broad definition of energy as a physical phenomenon and proceed to its definition in a statistical context, so that the concept of energy content of energy source/carriers is made operational for statistical purposes. The role of laws of thermodynamics in energy statistics will be acknowledged. The chapter will recommend to treat energy statistics as a complete system that (a) covers production, import/export, transformation and final use/consumption of energy sources/carriers; and (b) describes the main characteristics and activities of the energy sector. The existing differences in terminology currently used in energy statistics and other economic statistics (such as use versus consumption, stocks versus inventories) will be recognized with the intention to resolve them and/or clearly define their areas of application. The use of the International Standard Industrial Classification of All Economic Activities, Revision 4 (ISIC Rev. 4), as well as of the territory and residence principles and the related definitions of the statistical population, will be discussed (e.g., use of the territory principle in energy balances and the residence principle in energy accounts). The chapter will clarify the scope of energy statistics, including by defining the economic territory and the production boundary. The detailed definitions of the data items will be provided in chapter 7 after all necessary conceptual/classification issues are dealt with.

Chapter 3. Standard international energy classification

This chapter will introduce the standard international energy classification, which is intended to organize the internationally agreed definitions of energy sources/carriers into a hierarchical classification system, which would clearly represent the relationships between them and provide a coding system for use in data collection and data processing. It is proposed that the standard international energy classification will use physical and chemical properties, including energy content, of the energy sources/carriers as an underlying classification criterion. It is also expected that the standard international energy classification will provide a clear identification of the energy sources/carriers as primary/secondary and renewable/non-renewable. The chapter will describe the classification scheme of the standard international energy classification and its relationships with other international product classifications such as the Harmonized Commodity Description and Coding System 2007 (HS07) and Central Product Classification, Version 2 (CPC, Ver.2). The full text of the standard international energy classification will be provided in an annex. Every effort will be made to ensure that the standard international energy classification is ready on time. However, if it is not possible to finalize it prior to submission of the recommendations to the United Nations Statistical Commission for adoption, the chapter will be limited to a description of a list of agreed definitions. In such a case, the standard international energy classification may be issued as a separate publication.

Chapter 4. Units of measurement and conversion factors

This chapter will describe physical units of measurement (International System of Units) for the different products, recommend a standard unit of measurement (currently, joule), describe other measurement units (ton of oil equivalent, etc.) and recommend default conversion factors between units in absence of country-, region- and/or activity-specific conversion factors. The importance of specific conversion factors will be emphasized in this chapter. The factors will be presented in an annex to the international recommendations for energy statistics.

Chapter 5. Flows, stocks and related concepts

The main purpose of this chapter is to provide (a) a clarification of the boundary between flows and stocks; (b) a description of the relationship between stocks and other related concepts (reserves, resources, inventories, etc.); (c) a definition of the boundary between energy and non-energy flows; (d) general definitions of particular energy flows such as energy production, transformation, non-energy use, final energy use/consumption, etc.; and (e) a description of the differences between flows and stock defined on the basis of territory and residence principles. This chapter will also contain details on classification of the energy sector and energy users (in terms of ISIC, Rev.4 for industries) and households. The recommendations on measurement of flows and stocks in standard units of volume, weight and energy will be given, and the issues relevant to a monetary measurement will be introduced and discussed. In general, chapter 5 is intended to provide an overview of the flows from extraction and production to use/consumption in order to facilitate the understanding of data items presented in chapter 6.

Chapter 6. Statistical units and data items

This chapter will contain recommendations on the statistical units (and their characteristics) for use in data collection from both energy and non-energy sectors. The reference list of data items for collection (together with their definitions) will be provided. The list will cover energy flows and stocks of all energy sources/carriers, while the definitions of particular data items will reflect specificity of each source/carrier. Chapter 6 will be more technical than chapters 2 and 5. It will recommend, for instance, from what units (e.g., establishments, enterprises, households) data items should be collected and what kinds of data items can be collected from each of them. This chapter will provide a basis for the subsequent chapters on data sources and data compilation (chap. 7) and on construction of energy balances (chap. 8). It is envisaged that the list of data items and their definitions will focus more on processes and transactions than on products since the definitions of energy products will be presented in chapter 3. While chapter 5 will provide general definitions of flows, chapter 6 will explain any possible exceptions and details regarding specific products to be taken into account in the definition of particular data items.

Chapter 7. Data sources and data compilation strategies

This chapter will provide an overview of data sources (for example, administrative data, surveys, etc.) and data collection and data compilation strategies and methods relevant to both supply and use/consumption of energy. The guidance on the compilation of metadata will be provided as well. The importance and principles of effective institutional arrangements will also be emphasized and promoted. The purpose of this chapter is to focus on the main types of data sources and key elements of data compilation strategies such as organization of data collection from the various sources and merging those data. Details on methodology of estimation, imputation and seasonal adjustments are to be deferred to the Energy Statistics Compilers Manual. The exact boundary between the international recommendations for energy statistics and the Energy Statistics Compilers Manual in this respect is to be clarified during the recommendations drafting process.

Chapter 8. Energy balances

The objective of this chapter is to describe energy balances and their role in organizing energy statistics in a coherent system. It will contain recommendations on the balances compilation based on concepts, definitions and classifications and data items described in the previous chapters. The chapter is to cover both energy supply and use/consumption. It will highlight the importance of energy balances for making informed policy decisions, including by the identification of a set of indicators that can be derived from the balances and used for this and other analytical purposes. The forthcoming Energy Statistics Compilers Manual will start off where the international recommendations for energy statistics stop, and it is intended to provide an overview of good practices in the compilation of energy balances, elaborate selected country cases, etc.

Chapter 9. Data quality

This chapter will describe the main dimensions of energy data quality and provide recommendations on how to set up a national energy data quality

framework, including development and use of indicators of quality and data quality reporting. The importance of metadata availability for ensuring a high quality of energy statistics will also be stressed.

Chapter 10. Dissemination

This chapter will provide recommendations on energy statistics dissemination mechanisms, addressing data confidentiality, release schedules, core tables, dissemination of metadata and reporting to international and regional organizations.

Chapter 11. Use of energy balances in compilation of energy accounts and other statistics

This chapter will contain (a) an explanation of the conceptual relationships between basic energy statistics and balances, on the one hand, and energy accounts, on the other, including a description of how energy might be integrated into the national accounting framework on the basis of the forthcoming international standards on energy accounts, which is being developed as a part of the revision of the System of Integrated Environmental-Economic Accounting; and (b) a description of bridge tables that allow the compilation of energy accounts from the energy balances. Details on good practices in the compilation of bridge tables are to be elaborated in the Energy Statistics Compilers Manual. This chapter will also provide examples on the use of basic energy statistics and balances for other purposes (e.g., climate change, including emission calculations, etc.)

Annex

Standard international energy classification

The annex will provide a full text of the Standard International Energy Classification, as well as the correspondence tables between the Standard International Energy Classification, HS07 and CPC, Ver.2.

Glossary

Default conversion factors

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Bibliography